

REMARKS/ARGUMENTS

Claims 1 and 2 are pending. By this Amendment, claims 1 and 2 are amended.

Support for the amendments to claims 1 and 2 can be found, for example, in original claims 1 and 2. No new matter is added. In view of the foregoing amendments and following remarks, reconsideration and allowance are respectfully requested.

Rejection Under 35 U.S.C. §102

A. Okamoto

The Office Action rejects claims 1 and 2 under 35 U.S.C. §102(b) over JP 2002-212112 to Okamoto ("Okamoto"). Applicants respectfully traverse the rejection.

Claim 1 recites "[a] ruthenium compound for chemical vapor deposition, comprising at least one compound selected from the group consisting of: a compound represented by ... formula (1) ... and a compound represented by ... formula (2)." Okamoto does not disclose or suggest such a ruthenium compound.

The Office Action asserts that Okamoto discloses tricarbonyl ruthenium derivatives for use in preparing ruthenium thin films by chemical vapor deposition. *See* Office Action, page 2. While Okamoto appears to generally disclose cyclopentadienyl- and carbonyl-functionalized ruthenium compounds (*see, e.g.*, Okamoto, formulae [1] to [4]), Okamoto does not disclose ruthenium compounds having the particular structures given by formula (1) and formula (2) of claim 1. In particular, Okamoto fails to disclose or suggest cyclopentadienyl ruthenium compounds in which the cyclopentadienyl groups are functionalized with fluorine, trifluoromethyl groups, pentafluoroethyl groups and/or trialkylsilyl groups, as in formula (1). Okamoto also fails to disclose or suggest carbonyl ruthenium compounds in which the carbonyl groups are functionalized with trifluoromethyl groups and/or hydrocarbon groups having 1 to 10 carbon atoms, as in formula (2).

As Okamoto fails to disclose or suggest ruthenium compounds according to formula (1) or formula (2), Okamoto fails to disclose or suggest each and every feature of claim 1. In addition, as discussed in present specification, Okamoto is directed to one of several known, inferior methods for forming ruthenium thin films. *See* present specification, page 2, lines 7 to 26. In particular, the materials and methods disclosed in Okamoto provide films having an inferior surface morphology including sparsely situated fine crystals. When such a film is used as an electrode of a capacitor, current leakage increases due to electrostatic focusing. Attempts to make thin films using the materials and methods disclosed in Okamoto result in films including metal portions that are scattered like islands – this structure causes deteriorated electric conductivity. If such a film is used as an electrode of a capacitor, a large capacitor area cannot be ensured and the capacity necessary for operation as a capacitor cannot be obtained. The ruthenium compound of claim 1 addresses these shortcomings.

As explained, claim 1 is not anticipated by Okamoto. Claim 2 depends from claim 1 and, thus, also is not anticipated by Okamoto. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Vaartstra

The Office Action rejects claims 1 and 2 under 35 U.S.C. §102(b) over U.S. Patent No. 6,063,705 to Vaartstra ("Vaartstra"). Applicants respectfully traverse the rejection.

Claim 1 is set forth above. Vaartstra does not disclose or suggest such a ruthenium compound.

The Office Action asserts that Vaartstra discloses compounds such as cyclopentadienyltricarbonyl ruthenium for use in preparing ruthenium thin films by chemical vapor deposition. *See* Office Action, page 2. While Vaartstra appears to generally disclose cyclopentadienyl- and carbonyl-functionalized ruthenium compounds (*see, e.g.*, Vaartstra,

column 5, lines 24 to 34), Vaartstra does not disclose ruthenium compounds having the particular structures given by formula (1) and formula (2) of claim 1. In particular, Vaartstra fails to disclose or suggest cyclopentadienyl ruthenium compounds in which the cyclopentadienyl groups are functionalized with fluorine, trifluoromethyl groups, pentafluoroethyl groups and/or trialkylsilyl groups, as in formula (1). Vaartstra also fails to disclose or suggest carbonyl ruthenium compounds in which the carbonyl groups are functionalized with trifluoromethyl groups and/or hydrocarbon groups having 1 to 10 carbon atoms, as in formula (2).

As Vaartstra fails to disclose or suggest ruthenium compounds according to formula (1) or formula (2), Vaartstra fails to disclose or suggest each and every feature of claim 1. In addition, as discussed above with respect to Okamoto, Vaartstra is directed to one of several known methods for forming ruthenium thin films. *See* present specification, page 2, lines 7 to 26 (JP-A 2002-523634 is a Japanese counterpart to Vaartstra). When employed in film formation, the ruthenium compound of claim 1 provides superior, non-obvious results relative to the known materials and methods described in Vaartstra.

As explained, claim 1 is not anticipated by Vaartstra. Claim 2 depends from claim 1 and, thus, also is not anticipated by Vaartstra. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

- Application No. 10/537,484
- Reply to Office Action of December 19, 2006

Conclusion

For the foregoing reasons, Applicants submit that claims 1 and 2 are in condition for allowance. Prompt reconsideration and allowance are respectfully requested.

Respectfully submitted,

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